

4-109484

1. TITLE OF THE INVENTION

DISK DRIVE

2. CLAIMS

A disk drive, which governs a data recording and reproducing function of an information processing unit and which is detachably mounted on said information processing unit,

said disk drive comprising mechanism means configured by at least a rotation driving mechanism for rotatably driving a disk as a recording and reproducing medium, a recording and reproducing mechanism for recording and reproducing the data on said disk, and a position control mechanism for moving and positioning said recording and reproducing mechanism at a predetermined position of said disk; and control circuit means for controlling a predetermined function of said mechanism means,

wherein said mechanism means and said control circuit means are configured separably, said control circuit means is fixed on said information processing unit, said mechanism means is detachably mounted on said information processing unit, and a portion of packaging means for packaging said mechanism means is provided with buffer means.

3. DETAILED DESCRIPTION OF THE INVENTION

(TECHNICAL FILED TO WHICH THE INVENTION PERTAINS)

The present invention relates to a disk drive, which

governs a data recording and reproducing function of an information processing unit and which is detachably mounted on the information processing unit, and particularly relates to a disk drive, whereby a portability is improved.

(PRIOR ART)

As a typical example of a conventional disk drive, a configuration as disclosed in Japanese Patent Laid-open Publication No. 1-189091 has been known. For more detail, this configuration is shown in FIG. 4. FIG. 4 is a substantial part perspective view of the conventional disk drive.

FIG. 4 illustrates a condition that a disk drive 50 is detachably mounted on a body 60 of an information processing unit, for example, such as a personal computer or the like, wherein the disk drive 50 governs a data recording and reproducing function of the body 60 of the information processing unit.

The disk drive 50 is configured by a control circuit substrates 51 and a mechanism unit 52, and this control circuit substrate 51 is configured by a mechanism unit control circuit for controlling the mechanism unit 52, a control circuit for controlling the function as a disk drive, and an interface circuit (not illustrated) having an interface function between the control circuit and the body 60 of the information processing unit or the like. Then, the mechanism unit 52 is configured by a mechanism that is provided with a very precise processings such as a rotation driving mechanism for rotationally driving a disk as a recording and reproducing

medium, a recording and reproducing mechanism for recording and reproducing the data in the disk, and a positioning control mechanism (not illustrated) for moving and positioning the recording and reproducing mechanism to a predetermined position of the disk or the like.

On the other hand, the body 60 of the information processing unit has a detachable slot 61 being able to insert and mount the disk drive 50, and within the slot 61, a guide groove 62 is provided, which guides the control circuit substrate 51 to accept it therein.

On the basis of the above described mechanism, when the disk drive 50 is inserted in the body 60 of the information processing unit, this mechanism is mounted in a certain relation. Within in the slot 61, a connector mechanism conducting the control circuit substrate 51 in a certain relation is provided (its illustration is herein omitted), and the disk drive 50 functions as a part of the body 60 of the information processing unit so as to govern the recording and reproducing function of the data.

(TASK TO BE SOLVED BY THE INVENTION)

As described above, according to the mechanism of the above described technology, the disk drive 50, which is configured by the control circuit substrate 51 and the mechanism unit 52, is inserted in the body 60 of the information processing unit and is mounted thereon so as to function as a part of the body 60 of the information processing unit and govern the recording and reproducing function of the data. On the basis

of this mechanism, it is possible to easily extend a memory capacity of the information processing unit so as to improve the function. However, in the information processing unit such as a personal computer or the like, the downsizing of the unit has made progress in late years and further, the usage for this unit has been increased, so that the various data recording and reproducing functions are required and it has been highly required that the disk drive 50 capable of being exchanged in accordance with the usage application is mounted easily detachably and the portability of the disk drive 50 has been highly required so as to be carried on in accordance with a usage environment.

However, in the above described disk unit 50, the data recording and reproducing functions are integrated on the mechanism unit 52, and the control circuit substrate 51 does not have a direct function, so that when integrally exchanging and mounting the disk unit 50, the control circuit substrate 51 becomes very expensive unnecessarily, and it is difficult to downsize the described disk unit 50. This is a constitutional inhibitory point for downsizing of the information processing unit, for example, such as a personal computer or the like.

In addition, in the case that the above described conventional mechanism is carried and used in accordance with the usage environment and it meets with the disturbance failure, for example, such as the intense oscillation and the impact or the like, the mechanism unit 52 configured by above described

very precise processings does not have any buffer means. Therefore, even if the described disk unit 50 is mounted on the information processing unit, for example, such as the personal computer or the like, or the described disk unit 50 is detached to be treated as a single unit, it receives the disturbance failure such as the oscillation and the impact or the like, in order to maintain the initial capability, the described disk unit 50 should be treated with the greatest care.

Therefore, the present invention has been made taking the foregoing problems into consideration and an object of which is to provide a disk drive, which is simply configured, is manufactured by a reduce cost and in a compact size, and is preferably used to be exchangeably mounted and further, which is excel in preventing the disturbance failure such as the oscillation and the impact or the like.

(SOLUTION FOR THE TASK)

A disk drive according to the present invention is characterized by a disk drive, which governs data recording and reproducing between the information processing unit and which is detachably mounted on the above described information processing unit, the above described disk drive comprising mechanism means configured by at least a rotation driving mechanism for rotatably driving a disk as a recording and reproducing medium, a recording and reproducing mechanism for recording and reproducing the data on the above described disk; a position control mechanism for moving and positioning the above described recording and reproducing mechanism at a

predetermined position of the above described disk; and control circuit means for controlling a predetermined function of the above described mechanism means, wherein the above described mechanism means and the above described control circuit means are configured separably, the above described control circuit means is fixed on the above described information processing unit, the above described mechanism means is detachably mounted on the above described information processing unit, and a portion of packaging means for packaging the above described mechanism means is provided with buffer means.

(OPERATION)

According to the above described constitution of the present invention, the disk drive according to the present invention may comprise mechanism means, on which a data recording and reproducing function is integrated and is configured to drive a disk as a recording and reproducing medium, a recording and reproducing mechanism for recording and reproducing the data on the above described disk, and a position control mechanism for moving and positioning the above described recording and reproducing mechanism at a predetermined position of the above described disk; and control circuit means for controlling a predetermined function of the above described mechanism means, wherein the above described mechanism means and the above described control circuit means are configured separately, the above described control circuit means is fixed on the above described information processing

unit, the above described mechanism means is detachably mounted on the above described information processing unit. For example, in case that the above mentioned disk drive is mounted on the information processing unit, for example, the personal computer or the like easily detachably to extend the memory capacity and the disk drive is used exchangeably in accordance with the usage application to improve the function, by exchanging the above described mechanism means only, this disk drive can attain the above described object and it is advantageous for its simplicity on the manufacture, low cost and configuration of reduced size.

In addition, a portion of packaging means for packaging the above described mechanism means is configured with buffer means. Therefore, the above described buffer means is effective in preventing the disturbance failure even in the case that the disk drive is carried and used in accordance with the usage environment and it meets with the unexpected the disturbance failure, for example, such as the intense oscillation and the impact or the like.

(MODE FOR CARRYING OUT THE INVENTION)

Each of FIG. 1, FIG. 2, and FIG. 3 illustrates the most preferable embodiment of a disk drive according to the present invention. FIG. 1 is a substantial part perspective view for explaining a condition that the disk drive is mounted on a personal computer, FIG. 2 is a substantial part cross-sectional view of the disk drive, and FIG. 3 is an internal detail perspective view of the disk drive.

At first, with reference to FIG. 1 and FIG. 2, the present embodiment will be described below. FIG. 1 shows a condition that a disk drive 10 for governing a data recording and reproducing function of an information processing unit 20 is detachably mounted on the information processing unit 20, of which downsizing of the unit has made progress, for example, a laptop type personal computer or the like. FIG. 2 shows a substantial internal configuration of the disk drive 10.

The disk drive 10 will be described later with reference to FIG. 3. A mechanism means 1 comprising a rotation driving mechanism for rotatably driving a disk as a recording and reproducing medium, a recording and reproducing mechanism for recording and reproducing the data on the above described disk, and a position control mechanism for moving and positioning the above described recording and reproducing mechanism at a predetermined position of the above described disk, is put into a package by cases 2 and 3, for example, made of a plastic material or the like, and an outer circumference of these cases 2 and 3 is provided with cushion members 4 and 5, for example, made of a rubber material or the like as the buffer means for protecting the above described mechanism means 1, in the case that the disk drive 10 meets with the disturbance failure, for example, such as the intense oscillation and the impact or the like.

Then, an opening 6 is disposed, which is common to at least one end of the case 2 or the case 3 and one cushion member 5; as a function for electrically connecting the above described

mechanism means 1 to the outside of the cases 2 and 3 through the opening 6, for example, connector means 7, for example, a card edge substrate or the like is provided; and the connector means 7 and the mechanism means 1 are connected by a flexible print substrate 8 that is made of, for example, a polyimide material or the like.

Further, in FIG. 2, the connector means 7 is provided with some position degree of freedom in horizontal and vertical directions to form so-called floating condition and the connector means 7 is attached to a portion of the case 3 with a screw 9.

In addition to the substantial internal constitution of the disk drive 10, the substantial outer constitution will be described below. As shown in FIG. 1, grooves 4a and 5a are formed at the horizontal surface of the above described cushion members 4 and 5 in the drawing.

On the other hand, with respect to the information processing unit 20 such as a laptop type personal computer or the like according to the present invention, of which downsizing has made progress in late years, the detailed description is herein omitted. However, the information processing unit 20 has a slot having fitted and pulled out the disk drive 20 therein and therefrom in an arrow direction 30, and within this slot, a guide mechanism, which is engaged with the grooves 4a and 5a of the cushion members 4 and 5 and guides the disk drive 10 to accept and hold it therein, is provided. When the disk drive 10 is inserted in the information processing unit 20, the disk

drive 10 is configured so that it is mounted on the information processing unit 20 with a certain relation.

In addition, at a dead end of the slot, as shown in FIG. 2 by a two dot-dashed line, a connector 21 is provided, which is engaged with the connector means 7, for example, a card edge substrate or the like that is disposed in the disk drive 10 to govern the electric connection.

Then, the connector 21 is mounted on a control circuit substrate 22, which configures the functions of a mechanism means control circuit disposed within the information processing unit 20 for controlling the above described mechanism means 1 of the drive disk 10, a control circuit for controlling the function as the disk drive, and an interface circuit or the like (its illustration is herein omitted) having an interface function between the control circuit and information processing unit 20. When the disk drive 10 is inserted in the information processing unit 20 to be mounted there, the disk drive 10 is engaged with the above mentioned connector means 7, for example, the card edge substrate or the like and a conduction relation is established in a certain relation. Under the control of the control circuit substrate 22, the disk drive 10 functions as a part of the information processing unit 20 to govern the data recording and reproducing function of the information processing unit 20.

By the way, originally, the mechanism means control circuit for controlling the above mentioned mechanism means 1 of the disk drive 10 and the control circuit for controlling

recording and reproducing the data as the disk drive or the like are not separated from the mechanism means 1 as the conventional example and they are arranged within the package made by the above described cases 2 and 3 that are made of, for example, a plastic material or the like to configure the disk drive 10. However, according to the present embodiment, the mechanism means control circuit is separated from the mechanism means 1, the control circuit substrate 22 is arranged within the information processing unit 20, only the above described mechanism means 1 is packaged by the cases 2 and 3 to be formed into the packaged disk drive 10, so that the disk drive 10 is configured with being detachable from the information processing unit 20.

Now, the internal constitution in which the mechanism means 1 is incorporated will be described with reference to FIG 3 below.

FIG. 3 is a cross-sectional view of the disk drive and in FIG. 3, mechanism means 1 is shown in a state such as a cover or the like is removed.

In FIG. 3, a reference numeral 11 denotes a disk as a recording and reproducing medium. According to the present embodiment, the disk, of which outer diameter is not more than 2.5 inch or is 3.5 inch, is applied.

The disk 11 is mounted on a rotation driving mechanism (its illustration is herein omitted) such as a motor or the like, that is fixed on a chassis 12 that is shaped in substantially box to be rotated.

On the other hand, a head 13, which is related to the disk 11 with floating by the minute amount and records and reproduces the data, has a rotation supporting point 14 and is installed at one end of a rotatable arm 15 so as to form a recording and reproducing mechanism that is movable in a diameter direction along a face of the disk 11.

Then, a position control mechanism configured by a voice coil motor 16 that moves and positions the head 13 on a certain position of the disk 11 by rotationally controlling the above described rotatable recording and reproducing mechanism is arranged on a substantially symmetrical position of the above described head 13 based on the above described rotation supporting point 14. Any mechanisms are provided with the very precise processings.

Further, as connection means for transmitting and receiving a signal between the head 13, the voice coil motor 16, and the outside of the mechanism means 1, a flexible print substrate 8 made of, for example, a polyimide material or the like is arranged and at a portion of the flexible print substrate 8, an amplifier circuit element 17 or the like of the head 13 is mounted. Then, an end of the amplifier circuit element 17 is extended to the outside of the mechanism means 1 to be connected with the above described connector means 7.

The mechanism means 1 configured as described above functions as a portion of the information processing unit 20 through the above described flexible print substrate 8 so as to satisfy the necessary function for recording and reproducing

the data.

With respect to the above described disk drive according to the present embodiment, remarkable points will be described as follows.

(1)

As described above with reference to FIG. 3, the mechanism means 1 of the disk drive 10 is configured by the rotation driving mechanism of the disk 11, recording and reproducing mechanism, and the control mechanism or the like. Any mechanisms are provided with the very precise processings. In order to maintain the initial capability, the close attention should be paid to its treating, and particularly, it is needed to protect the mechanisms from the disturbance failure such as the oscillation and the impact or the like.

However, as described above, in late years, in the information processing unit, for example, such as a personal computer or the like, the downsizing of the unit has made progress and further, the usage for this unit has been increased. As a result, its figuration has been chanted into so-called all-in-one computer, in which the ordinary functions are integrated as the laptop type personal computer, so that there are many cases that the information processing unit is carried and used in accordance with various usage applications and the occasions that the desk drive meets with the disturbance failure such as the oscillation and the impact or the like have been increased.

Therefore, according to the present embodiment, in order

to protect the above described disk drive 10 provided with the very precise processings from the disturbance failure, particularly, such as the oscillation and the impact or the like and to maintain the initial capability, as described with reference to FIG. 1 and FIG. 2, the mechanism means 1 comprising the rotation driving mechanism of the disk 11, the recording and reproducing mechanism, and the position control mechanism or the like being provided with the very precise processings is put into a package by the cases 2 and 3 that are made of, for example, the plastic material or the like. Further, as the buffer means for protecting the mechanism means 1 in the case that it meets with the disturbance failure, for example, such as the intense oscillation and the impact or the like, the cushion members 4 and 5 are provided at the outer circumference of the cases 2 and 3 made of, for example, a rubber material or the like. Therefore, even if the disk drive 10 falls down or comes in conflict with the other objects due to the unexpected accident in the case of detaching the disk drive 10 from the information processing unit 20 and treating it as a single unit, the cushion members 4 and 5 performs the sufficient buffer operation so as to protect the mechanism means 1 provided with the very precise processings, so that the reliability of the detaching the disk drive 10 has been highly improved.

In addition, differently from the configuration such that the mechanism unit and the control circuit unit are formed integrally as the conventional example, in the disk drive 10 according to the present embodiment, as described above, the

mechanism means 1 and the control circuit substrate 22 are configured with being separated and only the mechanism means 1 is packaged by the cases 2 and 3, so that the disk drive 10 according to the present embodiment is configured to be very light and it has a high impact absorbing ability of the above described buffer means.

Further, the above described configuration does not include the control circuit substrate 22, so that it is compact, thin and light. As a result, even in the limited space upon configuring the above described buffer means, the arranging space of the buffer means is easily assured, the high effective buffer means is easily configured, so that the buffer absorption ability has been further improved.

On the other hand, in the case that the disk drive 10 is mounted on the above described information processing unit 20, as described above with reference to FIG. 1, the grooves 4a and 5a are formed at the horizontal opposite ends of the above described cushion members 4 and 5 in the drawing; the described information processing unit 20 is provided with the guide mechanism, which is engaged with the grooves 4a and 5a of the cushion members 4 and 5 and guides the disk drive 10 to accept and hold it therein; and the disk drive 10 is mounted on the information processing unit 20 in a predetermined relation. Therefore, even if the information processing unit 20 having mounted the disk drive 10 thereon falls down or comes into conflict with the other things due to the above described unexpected accident, the cushion members 4 and 5 performs the

sufficient buffer operation so as to protect the mechanism means 1 provided with the very precise processings, so that the reliability of the information processing unit 20 has been very improved.

Further, in this buffer operation, in an electric connection relation between the above described information processing unit 20 and the disk drive 10, the connector means 7 such as the card edge substrate or the like that is attached to a portion of the case 3 with the screw 9 to form so-called floating condition and the flexible print substrate 8 made of, for example, a polyimide material or the like may govern the buffer operation.

In addition, in FIG. 1 and FIG. 2, the above described cushion members 4 and 5 are configured as the separate members, however, they are not limited to the two-body configuration. They may be configured integrally or they may be divided into a plurality of parts.

Further, according to the above described configuration that the disk drive 10 is mounted with reference to FIG. 1, the grooves 4a and 5a are formed at the horizontal opposite ends of the above described cushion members 4 and 5 in the drawing; the information processing unit 20 is provided with the guide mechanism, which is engaged with the grooves 4a and 5a of the cushion members 4 and 5 and guides the disk drive 10 to accept and hold it therein; and the disk drive 10 is configured so that it is mounted on the information processing unit 20 with a certain relation. However, on the absolutely contrary to this

(its illustration is herein omitted), the disk drive 10 may be configured so that projections or the like are configured at the horizontal opposite ends of the above described cushion members 4 and 5 in the drawing, respectively, and the information processing unit 20 is provided with the guide mechanism, which is engaged with these projections and guides the disk drive 10 to accept and hold it therein; and the disk drive 10 is mounted on the information processing unit 20 with a certain relation.

2)

In the disk drive 10 according to the present embodiment, the control circuit means and the mechanism means are not integrally configured as the conventional example, however, the disk drive 10 may comprise mechanism means 1 configured by at least a rotation driving mechanism for rotatably driving a disk 11 as a recording and reproducing medium, a recording and reproducing mechanism for recording and reproducing the data on the disk 11, and a position control mechanism for moving and positioning the above described recording and reproducing mechanism at a predetermined position of the disk 11; and a control circuit substrate 22 for at least controlling a predetermined function of the above described mechanism means, wherein the mechanism means 1 and the control circuit means 22 are configured separably, and the control circuit substrate 22 is fixed on the information processing unit 20. On the other hand, the packaged disk drive 10, in which the above described mechanism means 1 is packaged by the cases 2 and 3, is detachably

mounted on the information processing unit 20. If this packaged disk drive 10 is mounted on the information processing unit 20, it may function as a portion of the information processing unit 20 to govern the data recording and reproducing function. Further, the disk drive 1 is easily made compact, thin, and light since it does not include the above described control circuit substrate 22, so that the disk drive 1 is preferable to be mounted on the information processing unit, of which downsizing and thinning has made progress in late years, for example, a personal computer and a notebook type computer or the like.

In addition, the packaged disk drive 10, in which the above described mechanism means 1 detached from the above described information processing unit 20 is packaged by the cases 2 and 3, is capable of being carried independently, this packaged disk drive 10 is compact, thin, and light since it does not include the above described control circuit substrate 22 as described above, and the storage space thereof is smaller, so that the portability thereof is high. Then, when the mechanism unit and the control circuit unit are formed integrally as the conventional example, in the case of detaching the packaged disk drive 10 from the information processing unit 20 as described above, if the packaged disk drive 10 meets with the unexpected accident, for example, the disturbance failure such as the oscillation and the impact or the like, there is the occasion that the control circuit unit is damaged. However,

in the disk drive 10 according to the present embodiment, as described above, the above described mechanism means 1 and the

above described control circuit substrate 22 are separably configured, and only the mechanism means 1 is packaged by the cases 2 and 3, so that only the mechanism means 1 may be protected. Therefore, the configuration of this protecting means is simple and the reliability of the drive disk 1 is high.

In addition, under the condition that the information processing unit has been personalized and the usage for this unit has been increased, it is strongly required that the above described disk unit 10 is exchanged and used in accordance with the usage application, and the memory capacity of the information processing unit 20 is enabled to be easily extended so as to improve the functionality or the like. In response to this strong requirement, only the packaged disk drive 10 in which the recording and reproducing function of the data is integrated is detached, in which the mechanism means 1 is packaged by the cases 2 and 3. Therefore, it is possible to provide the disk drive at a very low cost.

(EFFECT OF THE INVENTION)

The above described present invention has the above described many practical effects in the embodiment of the present invention. Particularly, the disk drive according to the present invention can comprise mechanism means configured by at least a rotation driving mechanism for rotatably driving a disk as a recording and reproducing medium, a recording and reproducing mechanism for recording and reproducing the data on the disk, and a position control mechanism for moving and positioning the above described recording and reproducing

mechanism at a predetermined position of the disk; and a control circuit substrate for at least controlling a predetermined function of the above described mechanism means, wherein the mechanism means and the control circuit means are configured separately, and the control circuit substrate is fixed on the information processing unit. On the other hand, the packaged disk drive, in which the above described mechanism means is packaged, is detachably mounted on the information processing unit. Thus, the above described disk drive is capable of being easily made compact since it does not include the above described control circuit substrate, and in the case that the disk drive is installed in the information processing unit, of which downsizing has made progress in late years, for example, such as a personal computer or the like, the disk drive according to the present invention has a remarkable advantage in its compact configuration.

In addition, under the condition that the information processing unit has been personalized and the usage for this unit has been increased, it is strongly required that the above described disk unit is exchanged and used in accordance with the usage application, and the memory capacity of the information processing unit is enabled to be easily extended so as to improve the functionality or the like. In response to this strong requirement, according to the disk drive of the present invention, only the packaged disk drive in which the recording and reproducing function of the data is integrated is detached, in which the mechanism means is packaged by the

cases. Therefore, it is possible to provide the disk drive at a highly reduced cost.

Further, since a portion of the packaging means for packaging the above described mechanism means is provided with the buffer means, even when the disk drive is carried and used in accordance with the usage environment and it meets with the unexpected accident, for example, the disturbance failure such as the intense oscillation and the impact or the like, the above described buffer means prevents the disturbance to maintain the capability of the disk drive. Therefore, the disk drive is capable of being treated trustfully and it has a high reliability, so that the practical effect of the present invention is very high.

4. BRIEF DESCRIPTION OF THE DRAWINGS

Each of FIG. 1, FIG. 2, and FIG. 3 illustrates the most preferable embodiment of a disk drive according to the present invention. FIG. 1 is a substantial part perspective view for explaining a condition that the disk drive is mounted on a personal computer, FIG. 2 is a substantial part cross sectional view of the disk drive, and FIG. 3 is an internal detail perspective view of the disk drive. FIG. 4 is a substantial part perspective view of the conventional disk drive.

[EXPLANATION OF REFERENCE NUMERALS]

1 ... mechanism means, 2, 3 ... case, 4, 5 ... cushion member, 7 ... connector means, 10 ... disk drive, 20 ... information processing

unit

FIG. 1

4, 5: CUSHION MEMBER

10: DISK DRIVE

20: INFORMATION PROCESSING UNIT

FIG. 2

1: MECHANISM UNIT

2, 3: CASE

4. 5: CUSHION MEMBER

7: CONNECTOR MEANS

(19)



JAPANESE PATENT OFFICE

PATENT ABSTRACTS OF JAPAN

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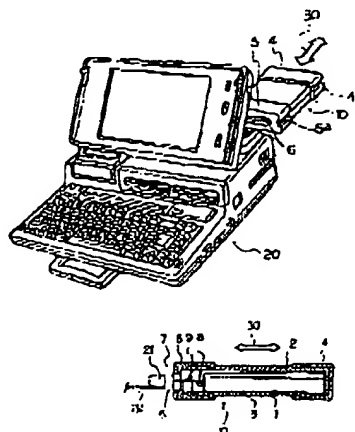
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G11B 33/06(21) Application number: **02227692**(71) Applicant: **SEIKO EPSON CORP**(22) Date of filing: **29.08.90**(72) Inventor: **ARIGA TOMOE**(54) **DISK DEVICE**

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(57) Abstract:

PURPOSE: To obtain an inexpensive and compact disk device and to improve protection from a disturbing fault such as vibration and shock by fixedly attaching a control circuit means to an information processor, attachably/ detachably constituting a mechanism means consisting of a position control mechanism to/from the information processor and fixing cushioning means to a part of means for covering the mechanism means.

CONSTITUTION: The mechanism means 1 and the control circuit base 22 are separately constituted, the base 22 is fixedly attached to the information processor 20 and a pack-like disk device 10 obtained by covering the means 1 by cases 2, 3 is attachably/detachably constituted to/from the processor 20. Plural cushioning members 4, 6 formed by a rubber material e.g. are formed on the outer periphery of the cases 2, 3. Consequently, the size, thickness and weight of the disk device 10 can easily be reduced, disturbing action can be protected by the cushioning means and the production price of the device 10 can also be reduced.



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明 細 書

事 を 特 徴 と す る デ ィ ス ク 装 置 。

1. 発明の名称

ディスク装置

2. 特許請求の範囲

情報処理装置のデータ記録再生機能を司り、該情報処理装置に着脱自在に装着されるディスク装置であり、該ディスク装置は、少なくとも記録再生媒体としてのディスクを回転駆動する回転駆動機構、該ディスクにデータの記録再生を行なう記録再生機構、前記ディスクの所定の位置に該記録再生機構を移動位置決めせしめる位置制御機構から成る機構手段と、該機構手段の所定の機能をコントロールする制御回路手段から成り、前記機構手段と該制御回路手段は分離可能に構成されて、前記制御回路手段は前記情報処理装置に固定的に装着され、前記機構手段は前記情報処理装置に着脱自在に構成されるとともに、該機構手段を構成する機構手段の一部に駆動手段を具備して構成した

3. 発明の詳細な説明

〔産業上の利用分野〕

本発明は情報処理装置のデータ記録再生機能を司り、該情報処理装置に着脱自在に装着されるディスク装置に関するものであり、更には、持ち運び性を向上させたディスク装置に関するものである。

〔従来の技術〕

従来のディスク装置の代表的な例は特開平1-189091の公開特許公報に示される如きの構造が知られており、より詳しくは第4図に示す。第4図は、従来のディスク装置の要部斜視図である。

第4図は例えばパーソナルコンピュータ等の情報処理装置の本体60に、該情報処理装置の本体60のデータ記録再生機能を司り着脱可能に装着されるディスク装置50を取り付けた状態を示し

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ている。

ディスク装置50は、制御回路基板51と52とから構成されていて、該制御回路基板51は該機構部52を制御する機構部制御回路、ディスク装置としてコントロールするコントロール回路、該コントロール回路と情報処理装置の本体60とのインターフェース機能を有するインターフェース回路等（図示省略）から構成されている。そして、機構部52は記録再生媒体としてのディスクを回転駆動する回転駆動機構、該ディスクにデータの記録再生を行なう記録再生機構、前記ディスクの所定の位置に該記録再生機構を移動位置決めせしめる位置制御機構等（図示省略）の超精密な組工が施された機構から構成されている。

一方、情報処理装置の本体60は前記ディスク装置50を挿入して装着可能なスロット61を有し、該スロット61内には前記制御回路基板51をガイドして受入可能なガイド溝62を具備している。

上記構造の基に、情報処理装置の本体60にデ

ィスク装置50を挿入すると、所定の関係で装着される構造であり、図示説明は省略するが前記スロット61内には前記制御回路基板51と所定の関係で導通するコネクタ機能が具備されていて、前記ディスク装置50は情報処理装置の本体60の一部として機能し、データの記録再生機能を司る構造である。

〔発明が解決しようとする課題〕

以上前述した様に従来の技術では、制御回路基板51と機構部52とから構成されたディスク装置50を、情報処理装置の本体60に挿入して装着し、該情報処理装置の本体60の一部として機能させ、情報処理装置のデータ記録再生機能を司る構造であり、情報処理装置のメモリー容量を容易に拡張可能ならしめ、機能向上を図るものであるが、近年、例えばパーソナルコンピュータ等の情報処理装置は、機器の小型化が進行するとともに利用対象が拡大し、多岐に渡るデータ記録再生機能が求められ、前記ディスク装置50を装着容

易に装着して利用用途に応じて交換使用可能な要求や、使用環境に応じて持ち運んで使用する持ち運び性の向上要求が高まってきた。

ところが、前述したディスク装置50ではデータ記録再生機能は前記機構部52に集約されており、制御回路基板51は直接的な機能を有しておらず、一体的に交換装着する場合には不必要に高価なものになり、また、ディスク装置50の小型化構成が難しく、例えばパーソナルコンピュータ等の情報処理装置の機器の小型化にとって構成上の阻害要因になっていた。

また、前述した従来の構造では、使用環境に応じて持ち運んで使用して、例えば強い振動や衝撃等の外乱環境に遭遇した場合に、前述した超精密な組工が施されて構成した機構部52は、なんら緩衝手段を有さないもので、例えばパーソナルコンピュータ等の情報処理装置にディスク装置50を装着した状態であっても、また、脱着して本体で取り扱う状態であっても、該振動や衝撃等の外乱障害を受けるので、初期の性能を維持するため

に細心の注意を払って取り扱わなければならなかった。

そこで、本発明は上記の様な課題を解決するもので、その目的とするところは、簡単な構造にして安価かつ小型で交換装着使用に好適であるとともに、振動や衝撃等の外乱障害防衛に優れたディスク装置を提供する事にある。

〔課題を解決するための手段〕

本発明のディスク駆動装置は、情報処理装置のデータ記録再生機能を司り、該情報処理装置に着脱自在に装着されるディスク装置であり、該ディスク装置は、少なくとも記録再生媒体としてのディスクを回転駆動する回転駆動機構、該ディスクにデータの記録再生を行なう記録再生機構、前記ディスクの所定の位置に該記録再生機構を移動位置決めせしめる位置制御機構から成る機構手段と、該機構手段の所定の機能をコントロールする制御回路手段から成り、前記機構手段と制御回路手段は分離可能に構成されて、前記制御回路手段は

前記情報処理装置に固定的に装着され、前記機構手段は前記情報処理装置に着脱自在に構成されるときともに、該機構手段を備える機構手段の一部に緩衝手段を具備して構成した事の特徴とする。

【作用】

本発明の上記の構成によれば、本発明のディスク装置は、少なくともディスクの回転駆動機構、データの記録再生を行なう記録再生機構、該記録再生機構を移動位置決めせしめる位置制御機構から成りデータの記録再生機能を果たした機構手段と、該機構手段の所定の機能をコントロールする制御回路手段から成り、前記機構手段と該制御回路手段は分離可能に構成されるときともに、前記制御回路手段は前記情報処理装置に固定的に装着され、前記機構手段は前記情報処理装置に着脱自在に構成されており、例えばパーソナルコンピュータ等の情報処理装置に前記ディスク装置を着脱容易に装着してメモリー容量を拡張可能ならしめ、利用用途に応じて交換使用して機能向上を図る場合に、

図20に、該情報処理装置20のデータ記録再生機能を司る該情報処理装置20に着脱可能に装着されるディスク装置10を装着した状態を示しており、第2図は該ディスク装置10の略内部構成を示している。

ディスク装置10は、後で第3図に基づいて詳述するが、記録再生媒体としてのディスクを回転駆動する回転駆動機構、該ディスクにデータの記録再生を行なう記録再生機構、前記ディスクの所定の位置に該記録再生機構を移動位置決めせしめる位置制御機構等から成る機構手段1を、例えばプラスチック材等で形成したケース2及びケース3により包囲してバック状に構成し、該ケース2及びケース3の外周には、例えば激しい振動や衝撃等の外乱に遭遇した場合に前記機構手段1を保護する緩衝手段として、例えばゴム材等から形成したクッション部材4及びクッション部材5を具備している。

そして、少なくともケース2またはケース3の一端及び一方のクッション部材5に共通する開口6

前記機構手段のみの交換使用で目的達成が可能となり、構造が簡単な上、安価でかつ小型な構成に有効である。

また、前記機構手段を備える機構手段の一部に緩衝手段を具備して構成しており、使用環境に応じて持ち運んで使用したりして、予断せぬ、例えば激しい振動や衝撃等の外乱環境に遭遇した場合でも、前記緩衝手段は該外乱作用防衛に有効である。

【実施例】

第1図及び第2図、第3図は本発明のディスク装置の最も適切な一実施例であり、第1図はディスク装置をパーソナルコンピュータに装着する状態を説明する要部斜視図、第2図はディスク装置の要部断面図、第3図はディスク装置の内部詳細斜視図である。

まず、第1図及び第2図に基づいて説明する。第1図は、近年小型化が進んだ例えばラップトップタイプのパーソナルコンピュータ等の情報処理

を設け、該開口6を通じて前記機構手段1とケース2及びケース3の外周との電気的接続を行なう機能として、例えばカードエッジ基板等のコネクタ手段7を備え、該コネクタ手段7と機構手段1は例えばポリイミド材等で形成されたフレキシブルプリント基板8により接続されている。

他、コネクタ手段7は第2図中左右上下方向に若干の位置自由度が設けられ、いわゆるフローティング状態を構成してネジ9によってケース3の一部に取り付けてある。

ディスク装置10の略内部構成の他に略外部構成について説明すると、第1図に示す如く前記クッション部材4及びクッション部材5の図中左右両端に溝4a及び溝5aを構成してある。

一方、近年小型化が進んだ本実施例の例えばラップトップタイプのパーソナルコンピュータ等の情報処理装置20は、詳細図示説明を省略するが、前記ディスク装置10を矢印30方向に挿脱可能なスロットを有し、該スロット内には前記クッション部材4及びクッション部材5の溝4a及び溝

5と係合してディスク装置10をガイドして受入保持可能なガイド機構を具備していて、情報処理装置20にディスク装置10を挿入すると、所定の関係で與えられる構造である。

また、前記スロット内の終端には、第2図に2点鎖線で図示する如く前述したディスク装置10に具備された例えばカードエッジ基板等のコネクタ手段7と係合して電気的な接続を司るコネクタ21を備えている。

そして、該コネクタ21は、情報処理装置20内に具備されていて前述したディスク装置10の機構手段1を制御する機構手段制御回路、ディスク装置としてコントロールするコントロール回路、該コントロール回路と情報処理装置20とのインターフェース機能を有するインターフェース回路等(図示省略)の機能を構成している制御回路基板22に実装されていて、情報処理装置20にディスク装置10を挿入して装着すると、前述の例えばカードエッジ基板等のコネクタ手段7と係合して所定の関係で導通関係が構成され、該制御回

路基板22の制御の基に前記ディスク装置10は情報処理装置20の一部として機能し、情報処理装置のデータ記録再生機能を司る構造である。

ところで、前述したディスク装置10の機構手段1を制御する機構手段制御回路、記録再生などのディスク装置としてコントロールするコントロール回路等は、本来は従来例の様に機構手段1と分離せずに、前述した例えばプラスチック材等で形成したケース2及びケース3により懐抱したバック状の内部に配置してディスク装置10を構成するものであるが、本実施例はこれを分離して構成し、前記制御回路基板22は情報処理装置20内に配置して、前述した略機構手段1のみをケース2及びケース3により懐抱してバック状のディスク装置10に形成し、情報処理装置20に容易自在に構成したものである。

次に、前記機構手段1が内蔵する内部構成について第3図に基づいて説明する。

第3図はディスク装置の内部詳細斜視図であり、カバー等の機構手段懐抱手段は取り除いて図示し

ている。

図中符号11は記録再生媒体としてのディスクであって、本実施例では外径がいわゆる2.5インチ以下または3.5インチサイズのもので適用されている。

該ディスク11は、略筒状のシャーン12に固定したモータ等の回転駆動機構(図示省略)に設置されて回転する構造になっている。

一方、前記ディスク11に対して微小量だけ浮上して関係し、データの記録再生を行なうヘッド13は、回転支点14を有して回転自在なアーム15の一端に搭載されていて、ディスク11の面に沿って径方向に移動自在な記録再生機構を成している。

そして、上記回転自在な記録再生機構の回転制御をして、ディスク11の所定の位置にヘッド13を移動位置決めせしめるボイスコイルモータ16から成る位置制御機構は、前記回転支点14を基準にして前記ヘッド13の略対称位置に配置しており、いずれの機構も超精密な細工が施されてい

る。

尚、前記ヘッド13及びボイスコイルモータ16と上記機構手段1の外部との信号の授受を行なう接続手段として、例えばポリイミド材等で形成されたフレキシブルプリント基板8を配置し、該フレキシブルプリント基板8の一部にはヘッド13のアンプ回路素子17等を実装しており、一端が上記機構手段1の外部に伸長していて、第2図で前述したコネクタ手段7に接続されている。

以上の構成から成る機構手段1は、前記フレキシブルプリント基板8を通じて情報処理装置20の一部として機能し、データ記録再生に必要な機能を充足している。

以上前述した本実施例のディスク装置について、ここで注目すべき点を以下の内容で整理する。

1)

第3図で前述した如く、ディスク装置10の機構手段1は、前記ディスク11の回転駆動機構、前記記録再生機構、前記位置制御機構等から成り、いずれの機構も超精密な細工が施されていて、初

局の性能を維持するにはその取り扱いに細心の注意を払い、特に振動や衝撃などの外乱障害から保護して臨む必要がある。

ところが、前述した如く、近年、例えばパーソナルコンピュータ等の情報処理装置は、機種の小型化が進行するとともに利用対象が拡大し、形態は例えばラップトップタイプのパーソナルコンピュータ等の様に一通りの機能が集約されたいわゆるオールインワンスタイルに変わって、多岐に渡る利用用途に応じて持ち運んで使用する場面が多くなっており、振動や衝撃などの外乱障害に遭遇する機会が増してきた。

そこで、本実施例では上記の超精密な細工が施されたディスク装置10を特に振動や衝撃などの外乱障害から保護し、初期の性能を維持する目的から、第1図及び第2図で前述した如く、前記ディスク11の回転駆動機構、前記記録再生機構、前記位置制御機構等から成り、いずれも超精密な細工が施されている機構手段1を、例えばプラスチック材等で形成したケース2及びケース3によ

り備包してバック状に構成し、該ケース2及びケース3の外周には、例えば激しい振動や衝撃等の外乱に遭遇した場合に前記機構手段1を保護する緩衝手段として、例えばゴム材等から形成したクッション部材4及びクッション部材5を具備しており、前記情報処理装置20からディスク装置10を挿抜して単体で扱う場合に、例えば予期せぬアクシデントに遭遇して落下したり、他の物に衝突したりしても、該クッション部材4及びクッション部材5が充分な緩衝作用を果たして、前述の超精密な細工が施されている機構手段1を保護するので、信頼性は極めて向上する。

また、従来例の様に機構部と制御回路部が一体になった構成とは異なり、本実施例のディスク装置10は、前述した如く前記機構手段1と前記制御回路基板22は分離可能に構成し、機構手段1のみをケース2及びケース3により備包したバック状に構成してあるので、極めて軽量に構成されており、前述の緩衝手段の衝撃吸収能力が高い。

更に、前述の構成は制御回路基板22を含まな

い分だけ小型、薄型、軽量であり、前述の緩衝手段の構成に当って限られた空間の中でも、緩衝手段の配置スペースの確保が容易であり、比較的大きな、高効率な緩衝手段の構成が容易であり、衝撃吸収能力は一層向上する。

一方、前記情報処理装置20にディスク装置10を装着して扱う場合でも、第1図で前述した如く前記クッション部材4及びクッション部材5の図中左右両端に溝4a及び溝5aを構成してあり、情報処理装置20には、該クッション部材4及びクッション部材5の溝4a及び溝5aと係合してディスク装置10をガイドして受入保持可能なガイド機構を具備して、所定の関係で装着する構造に構成してあるので、上述の様な例えば予期せぬアクシデントに遭遇してディスク装置10を装着した情報処理装置20を落下したり、他の物に衝突したりしても、該クッション部材4及びクッション部材5が充分な緩衝作用を果たして、前述の超精密な細工が施されている機構手段1を保護するので、極めて信頼性が高い。

尚、この緩衝作用に当って、前記情報処理装置20とディスク装置10との電気的な接続関係に於いては、前述したいわゆるフローティング状態を構成してネジ8によってケース3の一部に取り付けてある例えばカードエッジ基板等のコネクタ手段7と例えばポリイミド材等で形成されたフレキシブルプリント基板8が、その緩衝作用を司る。

また、第1図及び第2図では前記クッション部材4及びクッション部材5を別個の部材として構成してあるが、二体構成に限定されるものではなく、一体構成であっても、また、複数個に分割して構成してあっても良い。

更に、第1図で前述したディスク装置10の装着構造は、クッション部材4及びクッション部材5の図中左右両端に溝4a及び溝5aを構成し、情報処理装置20には、該溝4a及び溝5aと係合してディスク装置10をガイドして受入保持可能なガイド機構を具備して、所定の関係で装着する構造であったが、図示説明を省略するが全く上記構造とは逆に、前記クッション部材4及びクッ

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ション部材5の箇中左右両端に各々突起部等を構成し、情報処理装置20には、該突起部等と係合してディスク装置10をガイドして受入保持可能なガイド機構を具備して、所定の関係で装着する構造であっても良い。

2).

本実施例のディスク装置10は、従来例の様に制御回路手段と機構手段が一体となって構成されているものではなく、少なくとも記録再生媒体としてのディスク11を回転駆動する回転駆動機構、該ディスク11にデータの記録再生を行なう記録再生機構、前記ディスク11の所定の位置に該記録再生機構を移動位置決めせしめる位置制御機構から成る機構手段1と、少なくとも該機構手段の所定の機能をコントロールする制御回路基板22から成り、前記機構手段1と前記制御回路基板22は分離可能に構成するとともに、制御回路基板22は前記情報処理装置20に固定的に装着し、一方前記機構手段1をケース2及びケース3により備抱したバック状のディスク装置10は、情報処

理装置20に着脱自在に構成し、装着すると情報処理装置20の一部として機能して、データ記録再生機能を司る構造であり、ディスク装置10は前記制御回路基板22を含まない分だけ容易に小型化、薄型化、軽量化が達成でき、近年、益々小型化、薄型化が進行する例えばパーソナルコンピュータやノートブック型コンピュータ等の情報処理装置への搭載に好適である。

更に、前記情報処理装置20から脱着した前記機構手段1をケース2及びケース3により備抱したバック状のディスク装置10は、独立して持ち運びが可能であり、前述の如く制御回路基板22を含まない分だけ小型、薄型、軽量であるとともに、保管スペースが少なく携帯性に富んでいる。そして、従来例の様に機構部と制御回路部が一体になっていると、上記のように情報処理装置20からディスク装置10を脱着して取り扱う場合に、予期せぬ例えば振動や衝撃などの外乱障害に遭遇した場合に、制御回路部の破損機会もあるが、本実施例のディスク装置10は、前述した如く前記

機構手段1と前記制御回路基板22は分離可能に構成し、機構手段1のみをケース2及びケース3により備抱したバック状に構成してあるので、該機構手段1のみを保護する構成でよく、この保護手段の構成が単純であるばかりでなく、信頼性に富んでいる。

また、パーソナル化が進み、利用対象の拡大とともに前記ディスク装置10を利用用途に応じて交換使用し、情報処理装置20のメモリー容量を容易に拡張可能ならしめたり、機能向上を図る等の強い要求に対して、データの記録再生機能を兼ねた機構手段1をケース2及びケース3により備抱したバック状のディスク装置10のみの着脱により応えるものであり、極めて安価なディスク装置を提供できる。

【発明の効果】

以上述べた様に本発明によれば、本発明の実施例の中でも前述した数々の実用的効果を有するものであり、とりわけ、本発明のディスク装置にお

いては、少なくとも記録再生媒体としてのディスクを回転駆動する回転駆動機構、該ディスクにデータの記録再生を行なう記録再生機構、前記ディスクの所定の位置に該記録再生機構を移動位置決めせしめる位置制御機構から成る機構手段と、少なくとも該機構手段の所定の機能をコントロールする制御回路基板から成り、前記機構手段と前記制御回路基板は分離可能に構成するとともに、制御回路基板は前記情報処理装置に固定的に装着し、一方前記機構手段をバック状にして情報処理装置に着脱自在に構成した事により、該ディスク装置は前記制御回路基板を含まない分だけ容易に小型化が達成でき、近年、益々小型化が進行する例えばパーソナルコンピュータ等の情報処理装置に搭載する場合に、その小型化構成上のメリットは大きい。

また、パーソナル化が進み、利用対象の拡大とともに前記ディスク装置を利用用途に応じて交換使用し、情報処理装置のメモリー容量を容易に拡張可能ならしめたり、機能向上を図る等の強い要

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求に対して、本発明のディスク装置は、データの記録再生機能を集約した機構手段のみをバック状にして着脱自在に構成し、その要求に応えるものであり、極めて安価なディスク装置を提供できる。

更に、前記機構手段を備える懐抱手段の一部に緩衝手段を具備して構成した事により、使用環境に応じて持ち運んで使用したりして、予期せぬ、例えば激しい振動や衝撃等の外乱環境に遭遇した場合でも、前記緩衝手段は該外乱作用を防衛してディスク装置の性能を維持するので、安心した取り扱いが可能になり、信頼性に富む等、本発明の実用的効果は極めて大きい。

第4図は、従来のディスク装置の要部斜視図である。

1	.....	機構手段
2, 3	.....	ケース
4, 5	.....	クッション部材
7	.....	コネクタ手段
10	.....	ディスク装置
20	.....	情報処理装置

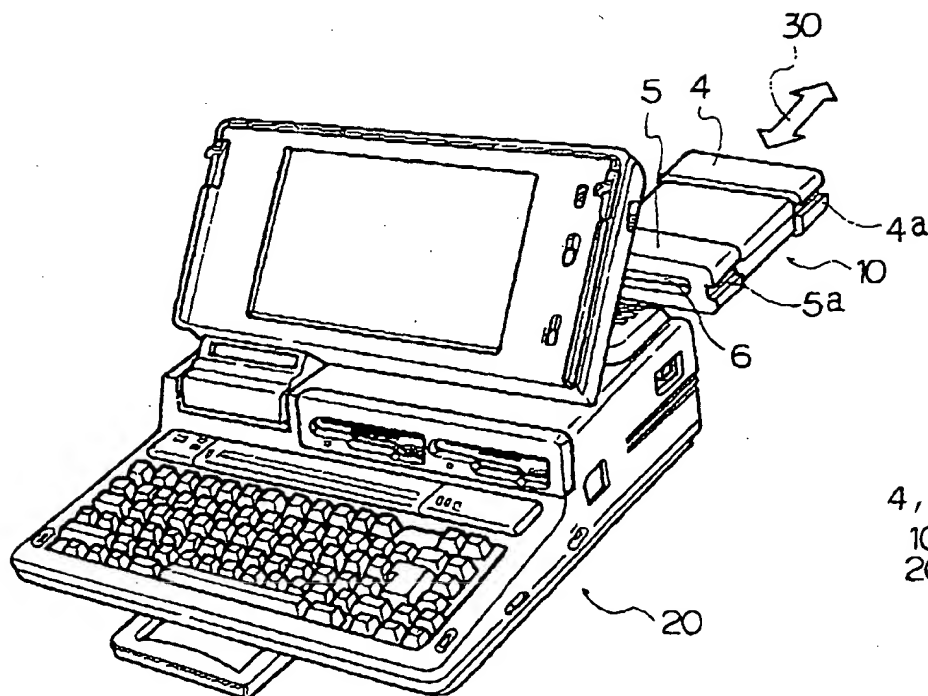
以上

出願人 セイコーエプソン株式会社

代理人 弁理士 鈴木喜三郎 他1名

4. 図面の簡単な説明

第1図及び第2図、第3図は本発明のディスク装置の最も適切な実施例であり、第1図はディスク装置をパーソナルコンピュータに装着する状態を説明する要部斜視図、第2図はディスク装置の要部断面図、第3図はディスク装置の内部詳細斜視図である。

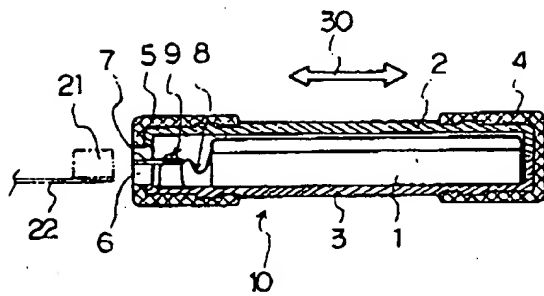


4, 5 クッション部材
10 ディスク装置
20 情報処理装置

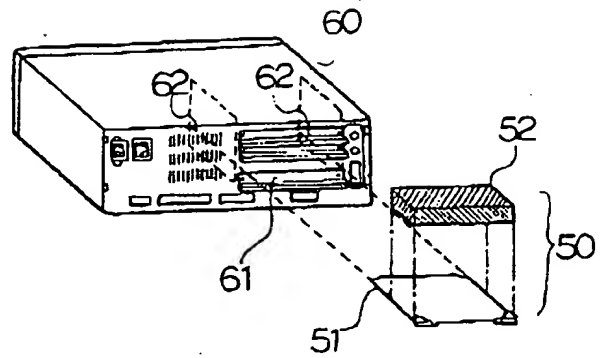
第1図

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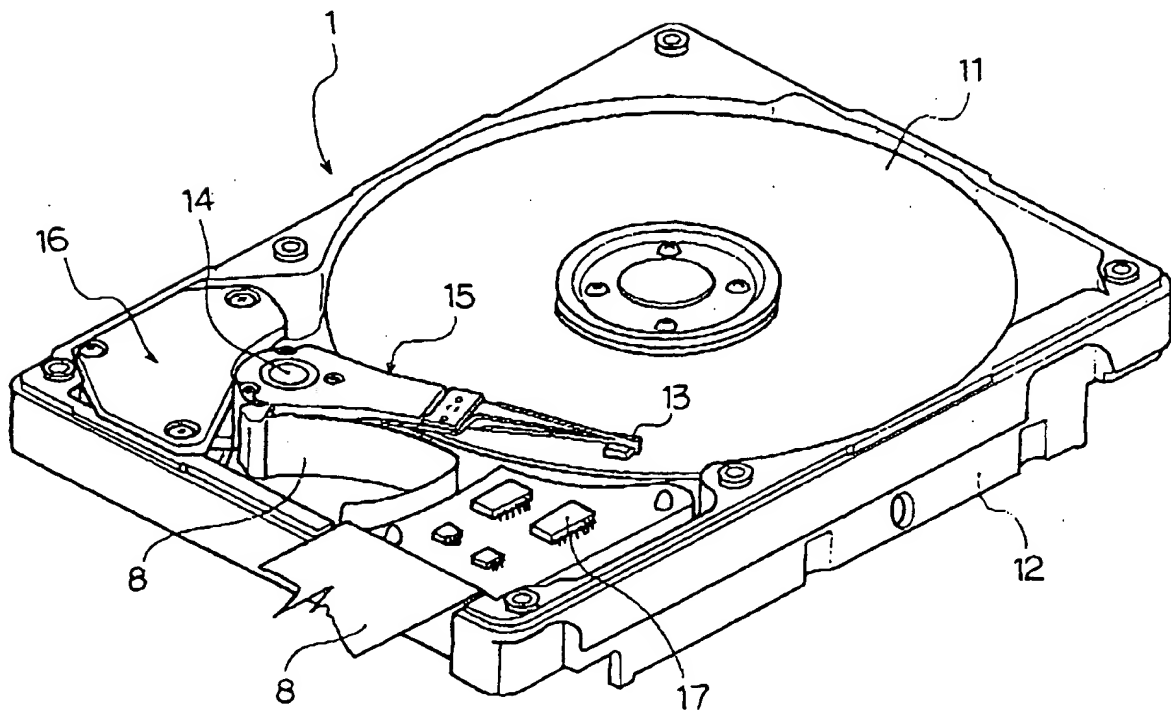
- 1 機構部
2,3 ケース
4,5 クッション部材
7 コネクタ手段



第 2 図



第 4 図



第 3 図